IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES
(Sprint Docket No. 1461)

In re the Application of:		)	
		)	
	Anthony Sabatino	)	
		)	
Serial No.:	09/597,530	)	Group Art Unit: 2686
		)	
Conf. No.:	5976	)	
		)	Examiner: Nghi H. Ly
Filed:	June 20, 2000	)	
		)	
For:	Aircraft Wireless Communication System and Method	)	

APPEAL BRIEF

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In re the Application of:		
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Serial No.:	09/597,530	Group Art Unit: 2686
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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF

Dear Sir:

This Appeal Brief is submitted pursuant 37 C.F.R. § 41.37, within two months (plus a one-month extension, a petition for which is submitted herewith) from the Notice of Appeal (Reinstatement of Appeal) received on March 30, 2006. Since this Appeal Brief is part of a reinstatement of appeal under MPEP § 1204.01, no fee is believed to be due. However, Applicant authorizes the Commissioner to deduct any underpayment or credit any overpayment to Deposit Account No. 210765.

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I. Real Party in Interest

The real party in interest is Sprint Spectrum L.P., to which this invention is assigned.

II. Related Appeals and Interferences

The Applicant is not aware of any related appeals or interferences. This particular appeal is a reinstatement of an appeal initiated by a Notice of Appeal mailed July 25, 2005 (and received August 1, 2005) and an associated appeal brief mailed September 30, 2005. The Examiner did not furnish a written answer to Applicant's first appeal brief and instead issued an additional Office action rejecting all 24 claims yet again. Applicant reinstates this appeal under MPEP §1204.01.

III. Status of Claims

Claims 1-24 are pending and rejected. A clean set of the pending claims is attached as Appendix A.

IV. Status of Amendments

There are no outstanding amendments.

V. Summary of Claimed Subject Matter

The application presently includes 24 claims. Of these, claims 1, 7, 15, and 23 are in independent format. The pending claims are directed to a system and method for providing wireless communication services to a passenger compartment of an aircraft in such a way that potential interference with sensitive equipment on-board the aircraft, such as a flight and control system often located in a cockpit area, is minimized. This is accomplished through use of a repeater, rather than an on-board base station, along with at least one low-energy transmission

medium, such as optical fiber. Finally, the one or more cabin antennae are placed so as to minimize back lobe energy at the cockpit, where sensitive flight systems are often based.

In this regard, each of independent claims 1, 7, 15, and 23 recites in various ways the element of: a cabin antenna (located in a passenger compartment of an aircraft), wherein (i) the cabin antenna is oriented such that a ***transmission pattern*** of the cabin antenna ***is substantially directed away from a cockpit area*** of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein (ii) the cabin antenna is ***additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area***, thereby further reducing interference to the flight and control system of the aircraft.

VI. Grounds of Rejection to be Reviewed on Appeal

Claims 1-4, 7-9, 11-13, 15-20, 23, and 24 stand rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over *Corbefin* (U.S. Patent No. 6,269,243) in view of *Powell* (U.S. Patent No. 4,916,460) and in further view of *Ritter* (U.S. Pub. No. 2002/0094829) and in further view of *Connolly* (U.S. Patent No. 5,274,391). Claims 5, 6, 10, 18, and 21 stand rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over *Corbefin* in view of *Powell* and *Ritter* and further in view of *Connolly* and *Gilhousen* (U.S. Patent No. 5,559,865). Claims 14 and 22 stand rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over *Corbefin* in view of *Powell* and *Ritter* and further in view of *Connolly*, *Gilhousen,* and *Mashida* (Japanese Patent No. 408167786A).

VII. Argument

The Office bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the Office does not produce an adequate *prima facie* case, the Applicant is under no obligation to submit evidence of nonobviousness. See, e.g., *In re Rinehart*, 531 F.2d 1048 (CCPA 1976).

In addition, according to MPEP § 2143.01, a statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. See *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993).

In other words, "[i]n determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification." *In re Linter*, 458 F.2d 1013, 1016 (CCPA 1972).

Moreover, Applicant notes that the Examiner has sought to combine together, with hindsight, a total of ***four, five, and even six references*** in an effort to reconstruct Applicant's invention of claims 1-24. Applicant submits that it is unlikely that a person of ordinary skill in the art could have combined together so many references, even in the manner suggested by the Examiner.

a. The Office Erred in Rejecting Claims 1-4, 7-9, 11-13, 15-20, 23, and 24 as Being Obvious Over a Combination of *Corbefin, Powell, Ritter,* and *Connolly*

According to MPEP § 2143, in order to establish a *prima facie* case of obviousness of a claimed invention by applying a combination of references, the proposed combination must teach or suggest all of the elements of the claimed invention. In addition, there must be some motivation to combine the reference teachings and a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in an applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Applicant respectfully submits that one of ordinary skill would not be motivated to combine *Corbefin*, *Powell*, *Ritter*, and *Connolly*.

Independent claims 1, 7, 15, and 23 each recite (i) the cabin antenna is oriented such that a transmission pattern of the cabin antenna ***is substantially directed away from a cockpit area*** of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and (ii) the cabin antenna is ***additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area***, thereby further reducing interference to the flight and control system of the aircraft.

Applicant submits that the Examiner's rejection of claims 1-4, 7-9, 11-13, 15-20, 23, and 24 by *Corbefin, Powell, Ritter,* and *Connolly* is an error as a matter of law because the proposed combination fails to teach or suggest all of the elements of the claimed invention.

Corbefin discloses a device including a transponder having a central unit and means of authority, along with first and second antennae to allow the use of the radiocommunication means on an aircraft. The central unit and means of authority act, on the basis of power-

matching, to "[compel] a radiocommunication means to operate at reduced power and for controlling the operation thereof." (See, e.g., *Corbefin*, col. 2, lines 27-33.) As a result, the device, in essence, assumes at least some control over a passenger's radio communication means. On the contrary, Applicant's invention does not affect the operating power of the radiocommunication means, but rather focuses on the design of the cabin antennae to minimize interference in the cockpit.

As recognized by the Examiner, *Corbefin* does not disclose a signal pathway linking the external antenna to the cabin antenna, with at least a portion of the signal pathway including at least one low-energy transmission medium. (*See* April 26th Office Action, page 3, lines 1-2.) The Examiner looks to *Powell* to remedy this deficiency. *Powell*, however, simply discloses a fiber optic distributed antenna system for use in a tunnel or building, for example. *Powell* teaches how fiber optics are an improvement over the prior art co-axial cable "leaky feeder" system because for the typically long cable lengths required in a tunnel or building, a fiber optic system does not suffer from the signal attenuation that a leaker feeder system would. See *Powell*, col. 3, lines 38-61. The cost advantages referenced in *Powell* are also likely due to the absence of repeaters (line 48) that a co-axial system might require to overcome attenuation problems over long distances.

In contrast, Applicant's invention is designed for much shorter distances. Most aircraft passenger compartments are less than a couple hundred feet, so attenuation would not likely be a problem. Thus, additional regenerating repeaters would not likely be required and the advantages of fiber optics taught in *Powell* would not be meaningful. In reality, for shorter distances, the costs involved with implementing fiber optics (including the lasers 24, photodetectors 30, filters

56, and amplifiers 58 of *Powell*) may actually be higher, which would likely be a negative factor for one of ordinary skill.

The motivation cited by the Examiner, *i.e.*, ensuring that signals traveling within the fiber optic network are unaffected by radio frequency interference, addresses a problem that might be unappreciable in the short cable lengths that would be required in an aircraft setting. Moreover, the Examiner has not provided any evidence that an aircraft is a noisy radio environment. The opposite is likely to be true, since an aircraft's flight communication and/or control system may be susceptible to such noise, and precautions are to be taken to prevent any such noise from occurring. In fact, this is the very problem addressed by Applicant's invention, and it is recognized in neither *Corbefin* nor *Powell*.

Moreover, the fiber optic network disclosed in *Powell* prevents outside signals from interfering with signal traveling within the communication pathway. See *Powell*, col. 3, lines 53-57. On the contrary, the fiber optic network in Applicant's invention prevents the signal traveling within communication pathway (the fiber optic network) from interfering with outside signals, such as the flight and control system which are substantially located in the cockpit area.

The Examiner also recognized that neither *Corbefin* nor *Powell* discloses the cabin antenna being oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft, the flight control system being located in the cockpit. The Examiner submits that *Ritter* teaches the cabin antenna being oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft because "[e]ach transceiver has an antenna oriented within the vehicle and in the direction of the passengers," and it would have been obvious to combine *Ritter* with *Corbefin*

and *Powell* to prevent communication signal interference with the cockpit. Applicant respectfully disagrees.

Although *Ritter* discloses each transceiver being oriented in the direction of the passengers, each transceiver is ***not*** substantially directed away from a cockpit area of the aircraft. Figure 1 of *Ritter* discloses at least one transceiver 32, located in the first compartment of the vehicle, which is directed *toward* the cockpit area 2. Indeed, *Ritter* clearly *teaches away* from each transceiver being substantially directed away from a cockpit area of the aircraft. *See In re Grasselli*, 713 F.2d 731, 743 (Fed. Cir. 1983). (It is improper to combine references where the references teach away from their combination). Furthermore, the aircraft in the present application could be a small commuter aircraft wherein the passengers would be located in the cockpit. Under the teachings of *Ritter*, the transceivers in the small commuter aircraft would be directed toward the cockpit area. Accordingly, *Ritter* fails to disclose the cabin antenna being oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft. The rejection is therefore improper and should be withdrawn.

The Examiner further recognized that the combination of *Corbefin*, *Powell*, and *Ritter* does not disclose the antenna being configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft. The Examiner submits that *Connolly* teaches an antenna with a high front-to-back ratio, and that it would be obvious to combine *Connolly* with *Corbefin*, *Powell*, and *Ritter* "in order to suppress back lobe (sic)." However, while the Examiner may have identified a problem Connolly attempts to solve (suppressing back lobe radiation), the Examiner has failed to provide any motivation to combine. In addition, the Examiner has not identified a specific teaching of the use of the high front-to-back-ratio

described in *Connolly* to minimize back lobe energy directed toward the cockpit area of an aircraft, which further reduces interference to a flight and control system. Moreover, as described above, Applicant submits that the combination of *Corbefin*, *Powell*, and *Ritter* is improper, and therefore the combination of *Corbefin*, *Powell*, *Ritter*, and *Connolly* is also improper and should be withdrawn.

Given that *Corbefin* does not disclose explicitly or inherently the combination of claimed elements as noted above, and *Powell, Ritter, and Connolly* likewise fail to disclose such subject matter, Applicant submits that these references either alone or combined, fail to disclose or suggest, all of the claimed elements. Additionally, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. MPEP § 2143.01, See also *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). In fact, only with impermissible hindsight would one of ordinary skill in the art think to combine the elements of *Corbefin, Powell, Ritter, and Connolly* to arrive at the presently claimed invention. The combination of elements in a manner that reconstructs Applicant's invention only with the benefit of hindsight, however, is insufficient to present a *prima facie* case of obviousness. *See In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992). Therefore, contrary to the Office's assertion in the final office action, the Office has not made out an adequate *prima facie* case of obviousness of Applicant's independent claims.

With respect to the dependent claims, dependent claims necessarily include the elements of the independent claims from which they depend. Since Applicant submits that *Corbefin*, *Powell*, *Ritter*, and *Connolly*, alone or combined, fail to teach all of the claimed elements of the independent claims for the reasons set forth above, the Applicant further submits that *Corbefin*, *Powell*, *Ritter*, and *Connolly*, alone or combined, fail to teach all the claimed elements of the

dependent claims. Thus, Applicant submits that the Office has failed to raise a *prima facie* case of obviousness with respect to the dependent claims.

b. **The Office Erred in Rejecting Claims 5, 6, 10, 18, and 21 as Being Obvious Over a Combination of *Corbefin* in view of *Powell* and *Ritter* and in further view of *Connolly* and *Gilhousen***

As further noted above, the Examiner rejected claims 5, 6, 10, 18, and 21 under 35 U.S.C. § 103(a) as being obvious over a combination of *Corbefin*, *Powell*, *Ritter*, *Connolly*, and *Gilhousen*. Applicant respectfully traverses these rejections, because the combination of *Corbefin*, *Powell*, *Ritter*, *Connolly*, and *Gilhousen* fails to teach or suggest each and every element of any of claims 5, 6, 10, 18, and 21, as would be required to establish a *prima facie* case of obviousness under MPEP § 2143.

Each of claims 5, 6, 10, 18, and 21 ultimately depends from either claim 1, 7, or 15 and therefore incorporates all of the limitations of respective claim 1, 7, or 15. As discussed above, neither *Corbefin* nor *Powell* nor *Ritter*, nor *Connolly*, separately or in combination, teaches or suggests the invention as recited in any of claims 1, 7, or 15. Therefore, neither *Corbefin* nor *Powell* nor *Ritter*, nor *Connolly*, separately or in combination, teaches or suggest the invention as recited in any of claims 5, 6, 10, 18, and 21.

Further, Applicant respectfully submits that *Gilhousen* fails to overcome the deficiencies of *Corbefin*, *Powell*, *Ritter*, and *Connolly* described above.

Namely, *Gilhousen* fails to teach or suggest the element of: a cabin antenna (located in a passenger compartment of an aircraft), wherein (i) the cabin antenna is oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the

aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein (ii) the cabin antenna is additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft.

Applicant does not concede that the representations made more specifically by the Examiner with respect to dependent claims 5, 6, 10, 18, and 21 are correct. However, Applicant submits that those other points are moot in view of the fact that the cited combination fails to teach or suggest the invention as recited in any of parent claims 1, 7, and 15.

c. The Office Erred in Rejecting Claims 14 and 22 as Being Obvious Over a Combination of *Corbefin* in view of *Powell* and *Ritter* and further in view of *Connolly, Gilhousen,* and *Mashida*

The Examiner rejected claims 14 and 22 under § 103(a) as being unpatentable over a combination of *Corbefin, Powell, Ritter, Connolly, Gilhousen*, and *Mashida*. Applicant respectfully traverses rejections of claims 14 and 22, because the combination of *Corbefin, Powell, Ritter, Connolly, Gilhousen*, and *Mashida* fails to teach or suggest each and every element of these claims as would be required to establish a *prima facie* case of obviousness under MPEP § 2143.

Each of claims 14 and 22 ultimately depends on claim 7 or 15 and necessarily incorporates all of the limitations of respective claim 7 or 15. As discussed above, neither *Corbefin* nor *Powell* nor *Ritter* nor *Connolly* nor *Gilhousen*, separately or in combination, renders the invention of any of claims 7 and 15 obvious. Therefore, neither *Corbefin* nor *Powell*

nor *Ritter* nor *Connolly* nor *Gilhousen* separately or in combination, renders the invention of any of dependent claims 14 and 22 obvious. Further, Applicant respectfully submits that *Mashida* fails to overcome the deficiencies of *Corbefin, Powell, Ritter, Connolly,* and *Gilhousen* described above.

Namely, *Mashida* fails to teach or suggest the element of: a cabin antenna (located in a passenger compartment of an aircraft), wherein (i) the cabin antenna is oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein (ii) the cabin antenna is additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft.

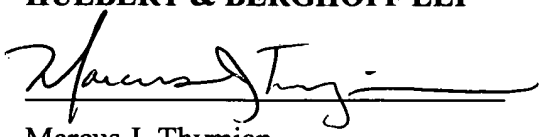
Applicant does not concede that the representations made more specifically by the Examiner with respect to dependent claims 14 and 22 are correct. However, Applicant submits that those other points are moot in view of the fact that the cited combination fails to teach or suggest the invention as recited in any of parent claims 7 and 15.

Conclusion

In light of the foregoing, the Applicant has demonstrated that the rejections of claims 1-24 are in error as a matter of law. The Applicant therefore requests reversal of the rejections and allowance of all pending claims in the application.

Respectfully submitted,
MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP

Date: June 27, 2006

By: 

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Reg. No. 43,954

APPENDIX A - Pending Claims

1. (Previously presented)A system for providing wireless communication service to a passenger compartment of an aircraft, comprising in combination:

an external antenna located on an exterior portion of the aircraft, the external antenna operable to receive an incoming external signal from and transmit an outgoing external signal to a terrestrial base station;

a cabin antenna located in the passenger compartment of the aircraft, wherein the cabin antenna is oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein the cabin antenna is additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft; and

a signal pathway linking the external antenna to the cabin antenna, wherein at least a portion of the signal pathway includes at least one low-energy transmission medium.

2. (Original) The system of Claim 1, wherein the low-energy transmission medium comprises at least one optical fiber.

3. (Original) The system of Claim 1, wherein the low-energy transmission medium is non-metallic.

4. (Previously presented) The system of Claim 2, wherein the at least one optical fiber has a first fiber end and a second fiber end, and wherein the signal pathway additionally comprises:

a repeater; and

first and second converters operable to convert RF signals to light energy and to convert light energy to RF signals, wherein the first converter is located at the first fiber end and the second converter is located at the second fiber end.

5. (Original) The system of Claim 4, wherein the repeater includes an amplifier.

6. (Original) The system of Claim 4, further comprising at least one amplifier operable to amplify a first frequency range and a second frequency range.

7. (Previously presented)A method for providing wireless communication service to a passenger compartment of an aircraft, comprising in combination:

receiving at an external antenna at least one incoming external signal from a terrestrial base station, wherein the external antenna is located on the aircraft;

converting the at least one incoming external signal into at least one incoming low-energy signal;

conveying the at least one incoming low-energy signal across a low-energy transmission medium;

converting the at least one incoming low-energy signal into at least one internal incoming signal; and

transmitting from a cabin antenna the at least one internal incoming signal into the passenger compartment, wherein the cabin antenna is oriented such that a transmission pattern of the antenna system is substantially directed away from a cockpit area of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein the cabin antenna is additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft.

8. (Original) The method of Claim 7, wherein the low-energy transmission medium includes at least one optical fiber, and wherein the at least one incoming low-energy signal is composed of light energy.

9. (Original) The method of Claim 7, wherein the at least one external antenna is located on an exterior portion of the aircraft.

10. (Original) The method of Claim 7, further comprising repeating the at least one incoming external signal.

11. (Original) The method of Claim 7, wherein the steps of receiving and converting the at least one incoming external signal are performed at a location outside the passenger compartment.

12. (Original) The method of Claim 7, wherein the incoming external signals and the incoming internal signals are RF signals.

13. (Original) The method of Claim 12, wherein repeating the at least one incoming external signal includes amplifying the at least one incoming external signal.

14. (Original) The method of Claim 12, wherein the steps of repeating and converting the at least one incoming external signal are performed in an electromagnetically isolated portion of the aircraft.

15. (Previously presented) A method for providing wireless communication service to a passenger compartment of an aircraft, comprising in combination:

receiving at a cabin antenna at least one outgoing internal signal from a wireless handset located in the passenger compartment, wherein the cabin antenna is oriented such that a transmission pattern of the antenna system is substantially directed away from a cockpit area of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein the cabin antenna is additionally configured with a high front-to-back ratio to

substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft;

converting the at least one outgoing internal signal into at least one outgoing low-energy signal;

conveying the at least one outgoing low-energy signal across a low-energy transmission medium;

converting the at least one outgoing low-energy signal to at least one outgoing external signal; and

transmitting the at least one outgoing external signal to a terrestrial base station.

16. (Original) The method of Claim 15, wherein the low-energy transmission medium includes at least one optical fiber, and wherein the at least one outgoing low-energy signal is composed of light energy.

17. (Original) The method of Claim 15, wherein the at least one external antenna is located on an exterior portion of the aircraft.

18. (Original) The method of Claim 15, further comprising repeating the at least one outgoing external signal.

19. (Original) The method of Claim 15, wherein the step of converting the at least one low-energy outgoing signal and the step of transmitting the at least one outgoing external signal are performed at a location outside the passenger compartment.

20. (Original) The method of Claim 15, wherein the outgoing internal signal and the outgoing external signal are RF signals.

21. (Original) The method of Claim 18, wherein repeating the at least one outgoing external signal includes amplifying the at least one outgoing external signal.

22. (Original) The method of Claim 18, wherein the step of converting the at least one outgoing low-energy signal and the step of repeating the at least one outgoing external signal are performed in an electromagnetically isolated portion of the aircraft.

23. (Previously presented) A system for providing wireless communication service to a passenger compartment of an aircraft, comprising in combination:

an external antenna mounted on an exterior portion of the aircraft, wherein the external antenna is operable to receive an incoming external signal from and transmit an outgoing external signal to a terrestrial base station;

a repeater including at least one amplifier, wherein the repeater is operable to repeat the incoming external signal and an outgoing external signal;

a first converter operable to convert the incoming external signal to an incoming optical signal and to convert an outgoing optical signal to the outgoing external signal;

at least one cabin antenna unit having a cabin antenna and a second converter, wherein the second converter is operable to convert the incoming optical signal into an incoming internal signal, wherein the cabin antenna is operable to transmit the incoming internal signal to a wireless handset located in the passenger compartment and to receive an outgoing internal signal

from the wireless handset, and wherein the second converter is operable to convert the outgoing internal signal to the outgoing optical signal, and wherein the cabin antenna is oriented such that a transmission pattern of the cabin antenna is substantially directed away from a cockpit area of the aircraft to minimize interference with a flight and control system of the aircraft, the flight and control system being substantially located in the cockpit area, and wherein the cabin antenna is additionally configured with a high front-to-back ratio to substantially minimize back lobe energy directed toward the cockpit area, thereby further reducing interference to the flight and control system of the aircraft; and

at least one fiber optic cable operable to convey the incoming optical signal from the first converter to the at least one cabin antenna unit and to convey the outgoing optical signal from the at least one cabin antenna unit to the first converter.

24. (Original) The system of Claim 23, wherein the incoming external signal, the incoming internal signal, the outgoing internal signal, and the outgoing external signal are RF signals.